Cortical Venous Aneurysm Isolated Cerebral Varix

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Summary

Venous aneurysms so-called isolated cerebral varix, are known as a related pathology in arteriovenous malformations (AVM) due to the arterial pressure on venous drainage [16]*. They are also observed in combination with developmental venous anomalies (DVA)* [2,4,8,15]*. However, isolated varix is a rare entity* [1,7,11,13]*. They appear in most cases without neurological deficits. Some of the cases mimic a meningioma due to their manifestation in CT and MR imaging and their axial cortical localization.*

The case presented here is a isolated varix of a cortical vein located rostral to the motor strip. The patient was operated on successfully. The MRI and the histology of the case are presented.

Case Report

A 40-year-old woman presented with unspecific headaches. Physical examination was unrevealing and there were no neurological deficits. Magnetic resonance imaging was performed and revealed a significant contrast material enhancement of a cortical parasagittal structure (figure 1). No abnormal feeding vessel and no significant drainage were observed. The radiological differential diagnosis were a cortical located meningioma or cavernous angioma.

At surgery a 1.5 cm pliable structure was shining through the dura. The cortical bone above the lesion was impressed. The dura mater was loosely attached to the lesion. The cortex and several superficial vessels were displaced by the varix. Several microscopically small vessels were embedded in the adventitial surface but none of the cortical vessels communicated with the lesion. Surgical dissection revealed no arterial feeder. One of the superficial veins could be identified as the feeding vessel and another as the draining vessel (figure 2). After temporary compression of the feeding vessel for 15 minutes no congestive signs were observed. The vessel was sacrificed and the venous bulb collapsed (figure 3B). It was resected entirely (figure 3C).

Histological investigation showed the typical venous microstructure with a three layer wall (figure 4A). There were no signs of thickened or fibrotic intima as seen in veins under arterial pressure. Signs of thrombosis or surrounding hemosiderin were not observed.

Computed tomography after surgery displayed no signs of venous congestion. A transient fine motor movement disability remained for three days then the patient did well.

Discussion

Classification and Incidence: Venous varices arise with arteriovenous malformations [16], developmental venous anomalies [9] and rarely as singular lesions. Most commonly, they appear

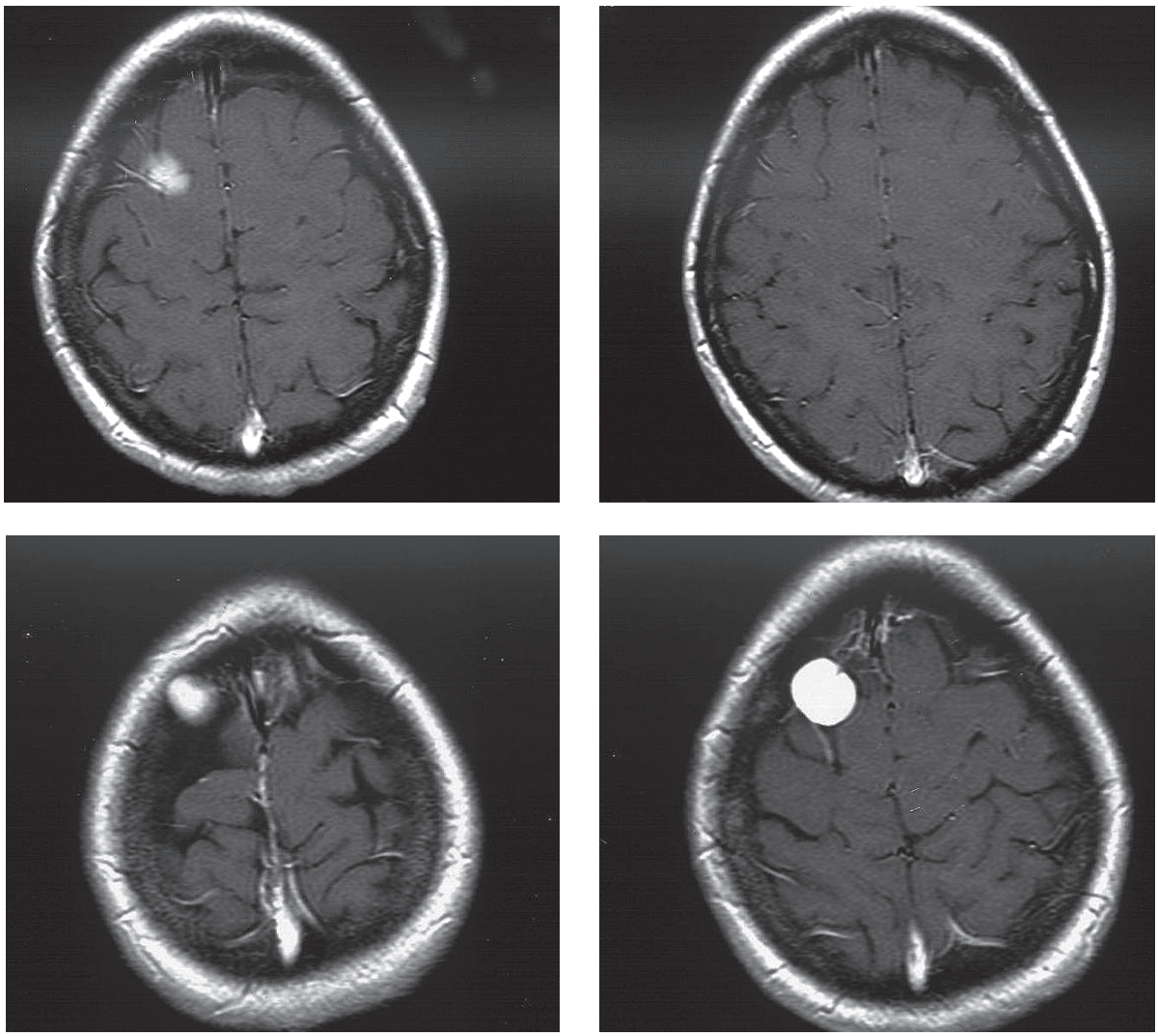

Figure 1 MRI with contrast medium. The Varix is displayed precentrally on the right side. No pathological vessel is visualized.

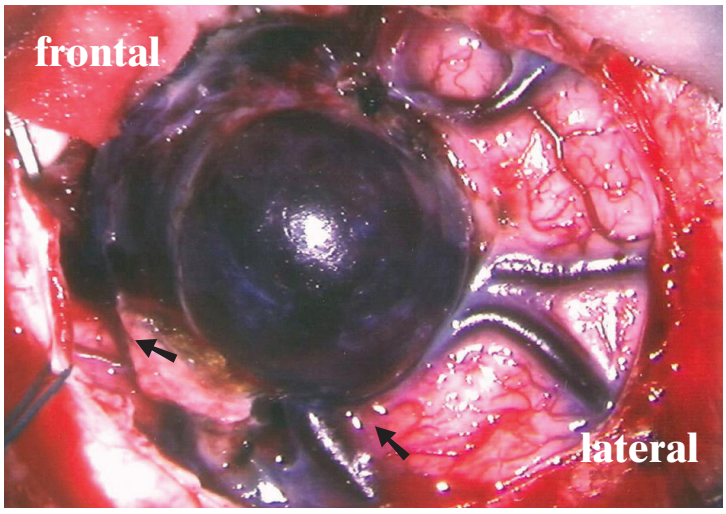

Figure 2 The blue bar on the left side indicates the position of the superior saggital sinus. The arrows display the feeding and the draining vein. All other vessels were not draining blood via the varix.

as focal dilatations of the venous drainage of arteriovenous malformations. Varix of the great vein of Galen is a variant, usually occurring in children [10].

Varices occurring with DVA´s are rarely observed. They usually appear in children or young adults supporting the idea of a congenital origin [9,15]. They were all supratentorial and showed no arterial components [5]. Isolated varix displays comparable histological features to those accompanied by DVAs [3].

Genesis: According to Lasjaunias, venous varix seem to be a remnant of a persistent embryological drainage with a potential defect of the wall texture [8]. Venous varix and DVA are different from angiomatous malformations [9].

A second attempt at explanation was introduced by Huang [5]. He proposed that dilatated medullary veins that can be found with glioblastomas may arise from reactivation of embryonic or fetal vascular remnants.

Histology: In our case as in the literature the isolated varix was composed of a single layer of fibromuscular tissue lined by a flat endothelium and free of a large coat of muscle or fibroelastic surrounding (figure 4A,B). The varix was separated from the nervous tissue. Thrombosis and reactive inflammatory changes may be present [6] but were not observed in this case. According to Hamada [3], all three components of the vessel

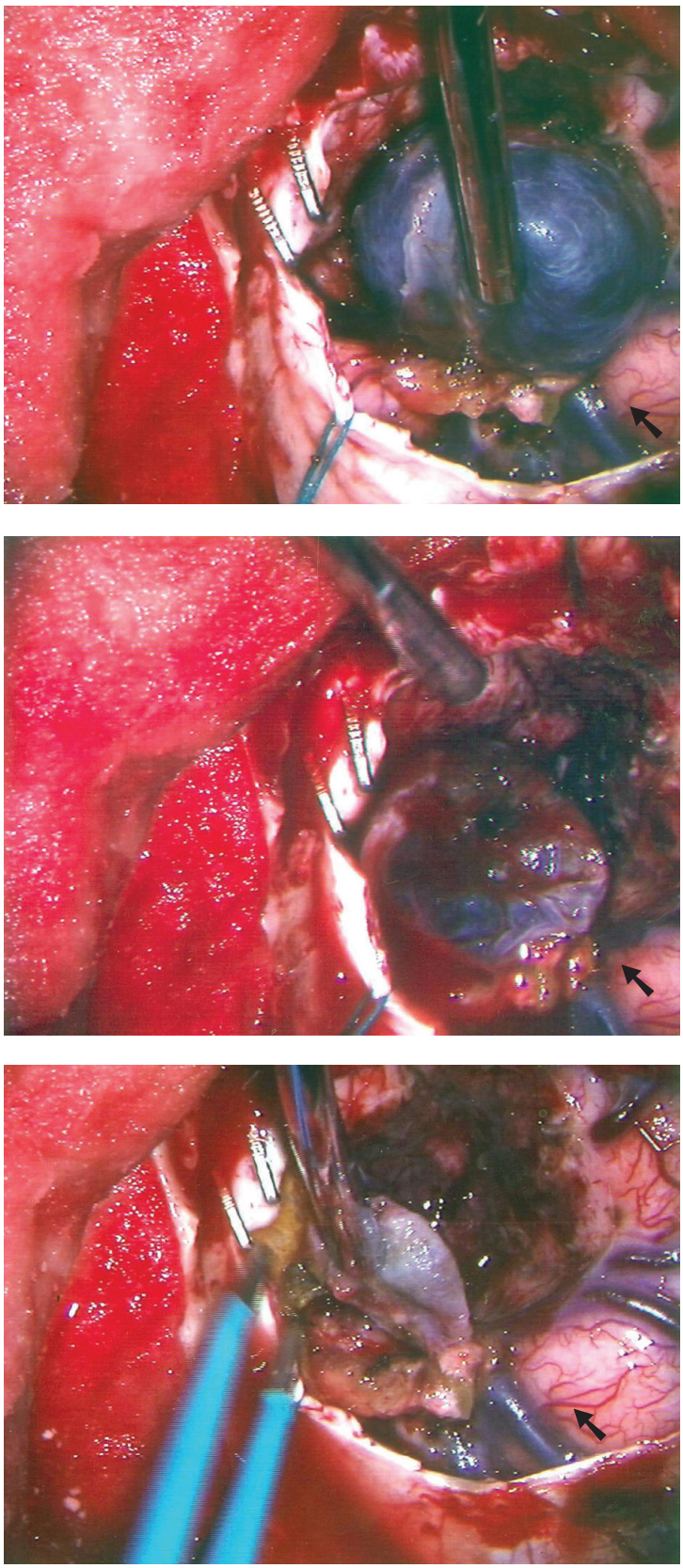

Figure 3 After preparation of the varix sac (A) it was made sure that no arterial feeder contributed to the blood supply of the varix. The feeding vein (arrow) was compressed over a time period of 15 minutes. Since no signs of venous congestion appeared the vein was permanently closed and the varix collapsed (B). The sac was removed for histological analysis (C).

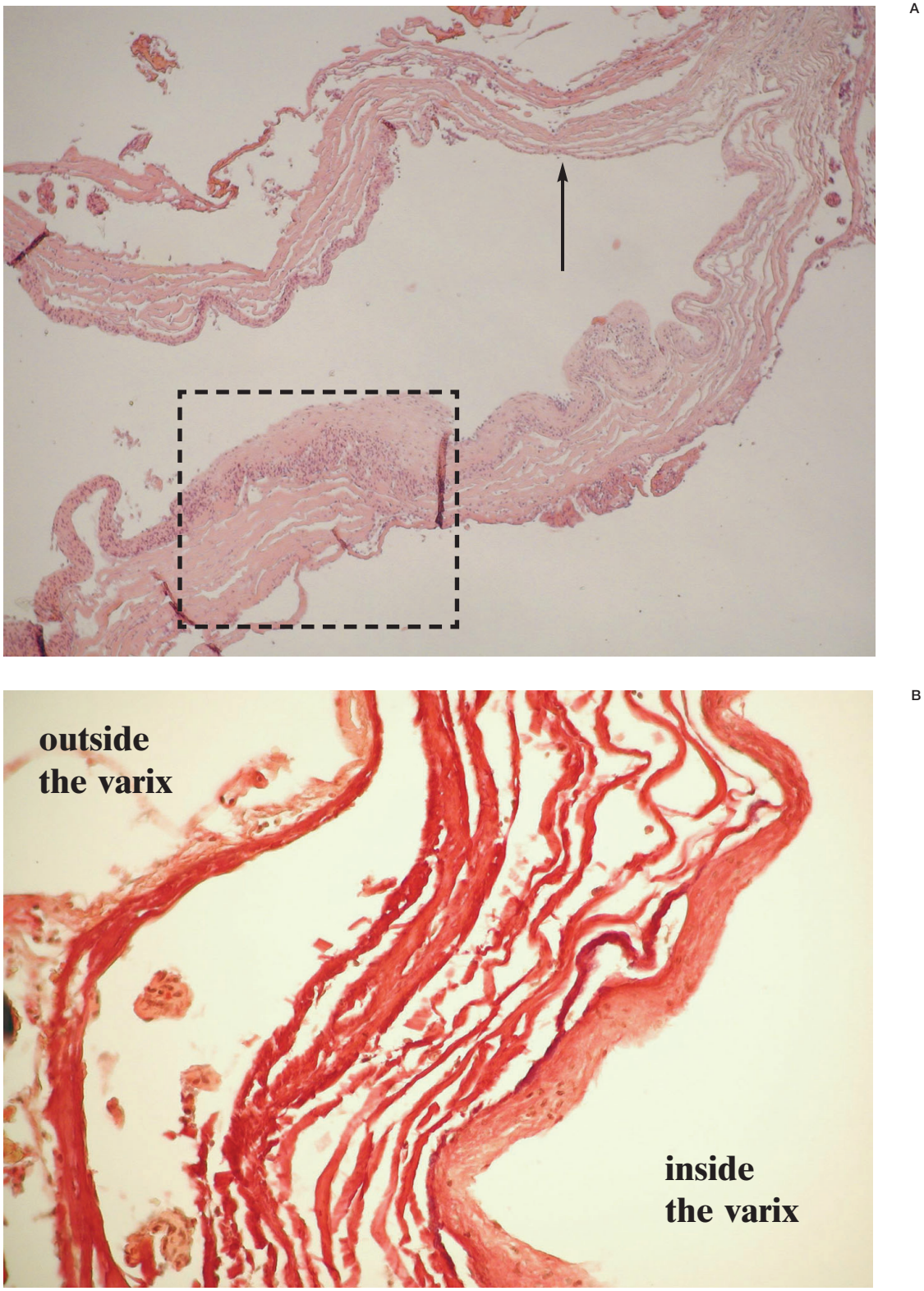

Figure 4 A,B) show a histological view of a cross section of the varix with a venous like layering of the wall (arrow). The thickened structures indicated by the dashed lines were due to intraoperative coagulation. A) HE, 100x. B) EVG, 400x.

walls of venous aneurysms were found to be thicker than in controls. In our specimen the vessel walls were also thicker than in normal veins. However, we presumed this to be an artifact from intraoperative coagulation (figure 4A). The macroscopic intraoperative appearance of the varix wall was in every respect comparable to a normal cortical vein.

Radiological appearance: Tanohata [13] described the CT appearance of isolated varix as a superficial extraaxial lesion presenting with erosion of the skull. The skull erosion was also described by Dietrich [1] and was observed in our case. The detection of bone erosion seem to be a helpful pattern to distinguish the varix from a meningioma that usually goes with skull hypertrophy. The varix displays a hyperintense signal with CT contrast media. It is round and has a smooth surface. If angiography is performed feeding and draining vein segments may be identified. The veins in our case were probably too small to be identified clearly with MR (figure 1). A Flow void phenomenon in MRI is expected [12] but there are also reports of different signals with any of the pulse sequences [15].

Conclusions

Bleeding from venous varix is reported [14] as well as neurological symptoms from secondary expansion of the lesion due to partially thrombosis [7]. The natural cause of a venous varix is mostly reported to be uneventful and the detection of the lesion is incidental. It is therefore concluded that surgery or alternative treatment is only recommended if bleeding has occurred [11,13]. Angiography might be indicated to ensure that the lesion is not a meningioma. Surgery bears the risk of closing a draining cortical vein and the risk of consecutive venous haemorrhage. It should be indicated very carefully.

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